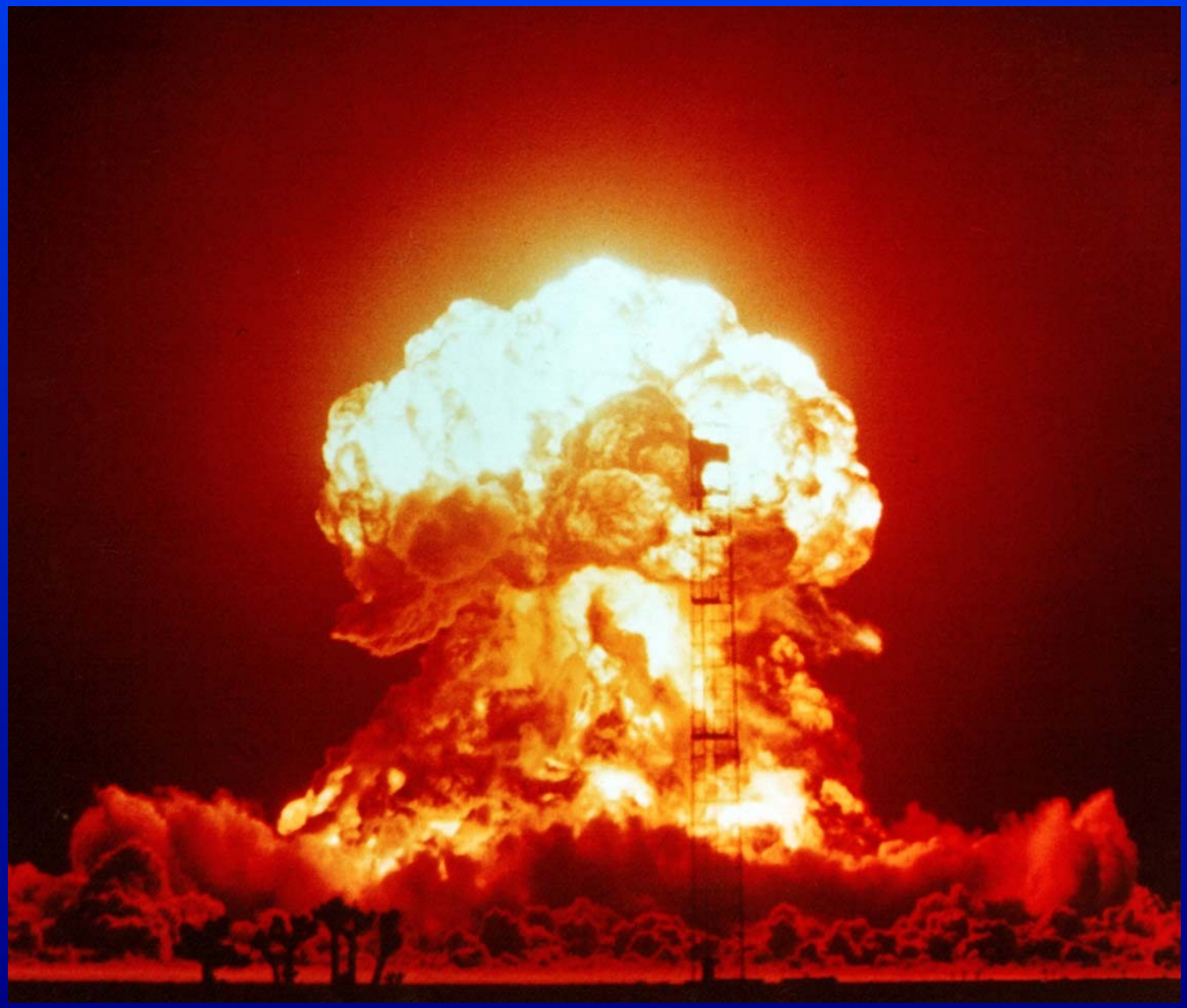
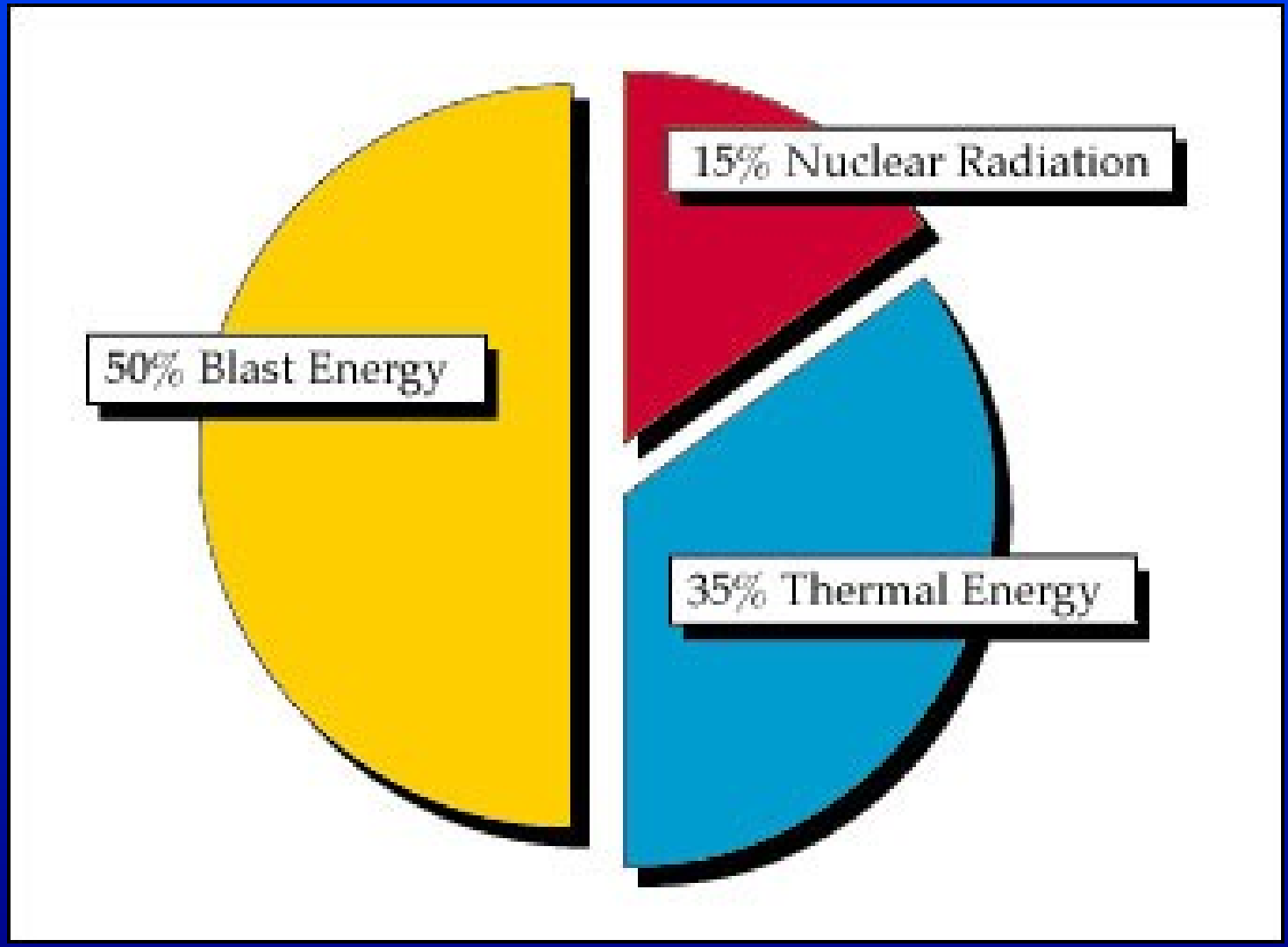
Nuclear Deterrence



Objectives

- Students will learn the effects of nuclear weapons including blast effects, thermal effects and radiation distribution
- Students will be familiar with the strategies of containment and strategic deterrence
- Students will learn communication limitations associated with a potential nuclear strike

The Energy from a Nuclear Weapon



The Energy from a Nuclear Weapon

- Blast Wave
  - Produced from heat of nuclear explosion
  - The shock front travels rapidly away from the fireball, a moving wall of highly compress

The Energy from a Nuclear Weapon

- Blast effects on humans
  - Serious injury or death can also occur from impact after being thrown through the air
  - Blast also magnifies thermal radiation burn injuries by tearing away severely burned skin
  - Collapse of the structure above can crush or suffocate those caught inside

The Energy from a Nuclear Weapon

- Thermal Energy
  - primary form of energy from a nuclear explosion
  - temperatures of a nuclear explosion reach those in the interior of the sun, about 100,000,000° C
  - damage depends very strongly on weather conditions

The Energy from a Nuclear Weapon

- Thermal Pulse Effect
  - energy is emitted from the fireball in two pulses
  - first is quite short, and carries only about 1 percent of the energy
  - second pulse is more significant and is of longer duration (up to 20 seconds).
  - energy from the thermal pulse can initiate fires in dry, flammable materials, such as dry leaves, grass, old newspaper, thin dark flammable fabrics, etc

The Energy from a Nuclear Weapon

- Thermal Pulse Effect

The Energy from a Nuclear Weapon

- Nuclear Radiation
  - Initial Radiation: defined as the radiation that arrives during the first minute after an explosion, and is mostly gamma radiation and neutron radiation
  - Residual Nuclear Radiation: mostly from the radioactive fallout and comes from the weapon debris, fission products, and, in the case of a ground burst, radiated soil.

Radiation Effects on Humans

- Factors affecting potential health effects of exposure to radiation
  - the size of the dose (amount of energy deposited in the body)
  - the ability of the radiation to harm human tissue
  - which organs are affected
- Systems affected by rad
  - Hair
  - Reproductive System
  - Heart
  - Blood System
  - Gastrointestinal Tract

Strategies of Containment

- Cold War Strategies and Goals
  - restoration of the balance of power in Europe
  - curtailment of Soviet power projection
  - modification of the Soviet conception of international relations
  - U.S. policy was to aid the establishment of independent centers of power in Europe and Asia
  - Goal was to encourage self-confidence in nations threatened by Soviet expansionism
  - USSR goes bankrupt trying to compete in arms race, resulting in fall of Soviet Union

Post Cold War Strategic Deterrence

- United States must now consider how to maintain a credible nuclear deterrent force in a more complex security environment
- Current nuclear stockpile maintains a credible deterrent against attack on the United States by a resurgent Russia or an emerging China
- New security environment requires the United States to analyze whether the current nuclear stockpile presents an adequate deterrence to protect democratic allies from emerging nuclear superpowers

Post Cold War Strategic Deterrence

Ohio Class SSBN

TLAM (Nuclear)

Communication Limitations Related to a Potential Nuclear Strike

- Population Centers Primary Targets
- Damage to lines of communication
  - Highways
  - Phone lines / Cell Phone towers
  - Satellites
- U.S. official warning system is designed to give civilians timely warning by means of siren signals and radio and television announcements
- National Warning System (NAWAS) is a wire-line network which is to provide attack information to official warning points nationwide